Product profile

iMVS

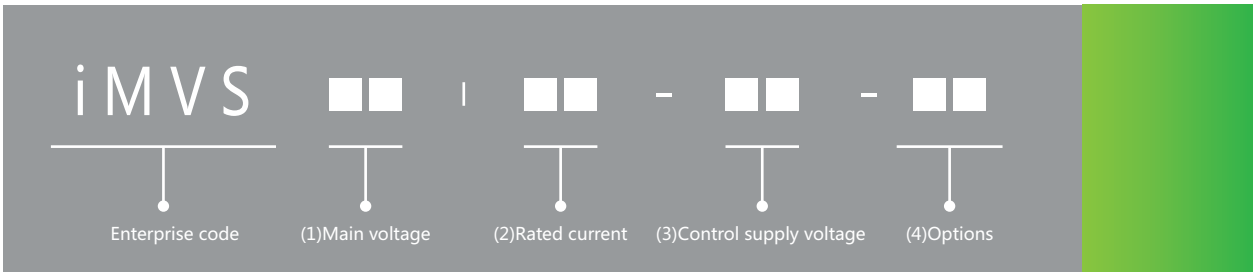
Medium voltage soft starter

iMVS series medium voltage solid-state soft starter device is designed to the new high-tech electrical equipment based on the third generation digital microprocessor-controlled technology and modern electronic power control technology. It is used to offer the optimal drop down-current limit soft start method for motors. To adapt to different load conditions and to reach better starting effect, a variety of control modes are applied to iMVS soft starter, and thus the motor can smoothly start in accelerating state at the minimum current, therefore effectively reduce the voltage drop of grid when starting, in the meantime, lower starting current and mechanical shock. When soft stop is required, the gently tapered controllable voltage can be provided to the motor for the smooth stop of the motor drive system.

Manage the data and communication by digital CPU, strong anti-interference ability by signal access and isolation. More stable and reliable. iMVS is a kind of high-performance digital Soft Starter, support smooth ramp up and ramp down of motors and reduce current impact and mechanical impact of motor and power net. Advanced optical fiber and optical fiber trigger technology ensure a full isolation of high voltage system and low voltage system. In the meantime support a perfect trigger, testing and isolation of high voltage SCR and control circuit.

VERICON SDN.BHD.
Add.:11,11-1,11-2,JALAN PUTERI 2A/7,BANDAR PUTERIBANGI,43000 KAJANG,SELANGOR

Ordering information



(1)Main voltage	Nominal value	For
	2.3KV	+10%-15%
	3.3KV	+10%-15%
	4.16KV	+10%-15%
	6.0KV	+10%-15%
	6.6KV	+10%-15%
	10KV	+10%-15%
(2)Rated current	60A---1450A	
(3)Control supply voltage	Nominal value	For
Default 220VAC	110VAC	100~120VAC
	220VAC	200~240VAC
	110VDC	100~120VDC
	220VDC	200~240VDC
(4)Options Note:For more than one option indicate for example 1+3	Code	Introducti on
	1	RS485-Modbus RTU
	2	RS485-Profibus DP
	3	Analogue output
	4	Touch screen

Features

Products standard

- Q/HP 001-2009 HPMV series middle and High voltage AC motor solid soft starter equipment.
- IEC 62271-200:2003 3.6 40.5KV AC metal close switch equipment and control equipment.
- IEC 60694:1996 The standard public technical requirements of the high voltage switch equipment and control equipment.
- IEC 60146-1-1:1991 the basic requirements provisions of the semiconductor convertor.
- IEC 60947-4-2:2002 low voltage switchgear set and control equipments. part 4-2:contactor and motor starter, AC semiconductor motor control equipments.

Motor & Starter Protection

- Too many starts & start inhibit time
- Long start time (Stall protection)
- Electronic overload with selectable curves
- Electronic shear-pin*
- Undercurrent*
- Unbalanced current*
- Ground fault current*
- Phase loss
- Phase sequence and under/over frequency
- Under voltage*
- Over voltage*
- External faults(2separated inputs)
- Shorted SCR& Wrong connection
- Starter over temperature
- Power on without start signal
- Open Bypass contactor

Function

Feature

- Advanced high frequency isolation and transfer technology support perfect working power for the components of high voltage system.
- Static and dynamic average voltage technology support reliable running of main components of serial connected high voltage.
- Advanced wireless voltage testing technology. Electric EVT technology, stable signal communication, no interference orremove.
- Six starting curves, to suit different kinds of motors and applications. Automatically adjust the rotate speed of motors, smooth and stable accelerate curve, reduce electrical and mechanical impact.
- Six stopping curves, to suit for different kinds of loadings, with the function of terminal torque adjustment. High effective to against pump's water-hammer while stopping period.
- Smooth stepless acceleration and deceleration.
- Pulse start, increase starting torque.
- Rich protection functions which includes over voltage, under voltage, over loading, under current, phase loss, phase unbalance, phase sequence wrong, grounding, over temperature of SCR, over starting time, starting cycle limit, SCR faulty protections and so on.
- Low voltage testing method. To test the full functions and quality of HPMV-DN soft starter by a low voltage motor. Support a complete performance report and parameter record.
- KYN24A-12 housing, raw material is made by imported aluminized zincograph. With the advantage of anti-corrosion, oxidation resistance, nice visual, high protection level. And easily to connect with other standard KYN28A-12 middle cabinets.
- For generator supporting conditions, special control program can guarantee a successful starting on unstable voltage, current, frequency, as well 1.35 times of motors capacity.
- Dual parameter input: for dual speed motors and power net and generator supporting electricity conditions, and for one drive two motors conditions, soft starter can input two instructions of starting and stopping through required parameter by PLC.
- Friendly control menu and record index. Touch screen(optional).
- The RS485 communication with Modbus or Profibus protocol enables full control isolation testing function. (Optional)

Technical performance

- Control method: pulse start, voltage ramp, constant current,rotation speed (optional).
- SoftStart/SoftStop method: Soft Start, direct start, soft stop,free stop.
- Control panel: on cabinet, remoted control, control centre(o-Ptional)
- Communication: RS485,MODBUS, PROFIBUS
- Analogue output: motor working current, 0~10v or 4~20mA.
- Initial voltage: 10% 50%Un(can be extended to 5%~80%Un).
- Current limit: 100% 400%In (can be extended to 500%).
- Soft start, soft stop time: 1~30s (can be extended to 90s).
- current, 70%~700%In, 0 10 .
- Pulse start: adjustable time: ~ sparameter setting:
  1) control panel,
  2)communication
- Parameter setting: 1) control panel, 2)communication
- LCD display: working current, start times, running time, faulty message, etc. Optional languages: English, Chinese, Russian, German, French, Spanish.
- Noise: <80db
- starting interval time: No less than 30 mins if temperature >40 , starting current> 400%In. At least 15mins for better condition.
- cooling: natural cooling.
- Operating power: AC220V/50Hz 600VA.
- Main circuit power frequency endurance:42KV/MIN.
- Protection level:IP42 (ip54 optional).

Ordering and guide

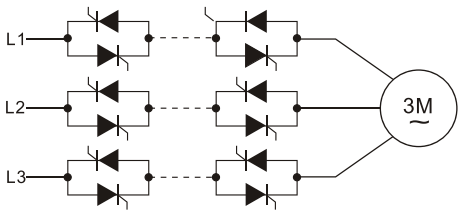
Model Code	Current (A)	Power (KW)	Measurement WxDxH(mm)
Voltage: 2.3 KV			
iMVS-2.3-60	60	200	1000x1300x2300
iMVS-2.3-100	100	330	1000x1300x2300
iMVS-2.3-150	150	495	1000x1300x2300
iMVS-2.3-200	200	660	1000x1300x2300
iMVS-2.3-300	300	990	1000x1200x2300
iMVS-2.3-400	400	1330	1200x1300x2300
iMVS-2.3-500	500	1660	1200x1300x2300
iMVS-2.3-600	600	2000	3300x1500x2400
iMVS-2.3-800	800	2660	3300x1500x2400
iMVS-2.3-1000	1000	3330	4250x1500x2400
Voltage: 4.16 KV			
iMVS-4.16-60	60	360	1000x1300x2300
iMVS-4.16-100	100	600	1000x1300x2300
iMVS-4.16-150	150	900	1000x1300x2300
iMVS-4.16-200	200	1200	1000x1300x2300
iMVS-4.16-300	300	1800	1000x1300x2300
iMVS-4.16-400	400	2410	1200x1300x2300
iMVS-4.16-500	500	3010	1200x1300x2300
iMVS-4.16-600	600	3610	3300x1500x2400
iMVS-4.16-800	800	4820	3300x1500x2400
iMVS-4.16-1000	1000	6030	4250x1500x2400
Voltage: 6.6 KV			
iMVS-6.6-60	60	570	1000x1300x2300
iMVS-6.6-100	100	950	1000x1300x2300
iMVS-6.6-150	150	1420	1000x1300x2300
iMVS-6.6-200	200	1900	1000x1300x2300
iMVS-6.6-300	300	2870	1000x1300x2300
iMVS-6.6-400	400	3820	1200x1300x2300
iMVS-6.6-500	500	4780	1200x1300x2300
iMVS-6.6-600	600	5736	3300x1500x2400
iMVS-6.6-800	800	7650	3300x1500x2400
iMVS-6.6-1000	1000	9570	4250x1500x2400
iMVS-6.6-1200	1200	11500	4250x1500x2400
iMVS-6.6-1400	1400	14000	4250x1500x2400
Voltage: 11 KV			
iMVS-11-60	60	950	1000x1300x2300
iMVS-11-100	100	1580	1000x1300x2300
iMVS-11-150	150	2370	1000x1300x2300
iMVS-11-200	200	3160	1000x1300x2300
iMVS-11-300	300	4800	1000x1300x2300
iMVS-11-400	400	6400	1200x1300x2300
iMVS-11-500	500	8000	1200x1300x2300
iMVS-11-600	600	9600	3300x1600x2400
iMVS-11-800	800	12800	3300x1600x2400
iMVS-11-1000	1000	16000	4250x1600x2400
iMVS-11-1200	1200	19200	4250x1600x2400
iMVS-11-1400	1400	22400	4250x1600x2400

Model Code	Current (A)	Power (KW)	Measurement WxDxH(mm)
Voltage: 3.3 KV			
iMVS-3.3-60	60	250	1000x1300x2300
iMVS-3.3-100	100	460	1000x1300x2300
iMVS-3.3-150	150	710	1000x1300x2300
iMVS-3.3-200	200	860	1000x1300x2300
iMVS-3.3-300	300	1350	1000x1200x2300
iMVS-3.3-400	400	1700	1200x1300x2300
iMVS-3.3-500	500	2500	1200x1300x2300
iMVS-3.3-600	600	2900	3300x1500x2400
iMVS-3.3-800	800	3450	3300x1500x2400
iMVS-3.3-1000	1000	4300	4250x1500x2400
iMVS-3.3-1200	1200	5100	4250x1500x2400
iMVS-3.3-1400	1400	6100	4250x1500x2400
Voltage: 6.0 KV			
iMVS-6.0-60	60	520	1000x1300x2300
iMVS-6.0-100	100	950	1000x1300x2300
iMVS-6.0-150	150	1290	1000x1300x2300
iMVS-6.0-200	200	1750	1000x1300x2300
iMVS-6.0-300	300	2800	1000x1300x2300
iMVS-6.0-400	400	3500	1200x1300x2300
iMVS-6.0-500	500	4400	1200x1300x2300
iMVS-6.0-600	600	5250	3300x1500x2400
iMVS-6.0-800	800	7050	3300x1500x2400
iMVS-6.0-1000	1000	8800	4250x1500x2400
iMVS-6.0-1250	1250	10000	4250x1500x2400
iMVS-6.0-1400	1400	12000	4250x1500x2400
Voltage: 10 KV			
iMVS-10-60	60	880	1000x1300x2300
iMVS-10-100	100	1600	1000x1300x2300
iMVS-10-150	150	2150	1000x1300x2300
iMVS-10-200	200	2900	1000x1300x2300
iMVS-10-300	300	4700	1000x1300x2300
iMVS-10-400	400	5880	1200x1300x2300
iMVS-10-500	500	7300	1200x1300x2300
iMVS-10-600	600	8800	3300x1600x2400
iMVS-10-800	800	11750	3300x1600x2400
iMVS-10-1000	1000	14500	4250x1600x2400
iMVS-10-1200	1200	18200	4250x1600x2400
iMVS-10-1400	1400	20300	4250x1600x2400
Voltage: 13.8 KV			
iMVS-13.8-60	60	1200	
iMVS-13.8-100	100	2000	
iMVS-13.8-150	150	3000	
iMVS-13.8-200	200	4000	
iMVS-13.8-300	300	6000	
iMVS-13.8-400	400	8000	
iMVS-13.8-500	500	10000	
iMVS-13.8-600	600	12000	
iMVS-13.8-800	800	16000	
iMVS-13.8-1000	1000	20000	
iMVS-13.8-1200	1200	24000	
iMVS-13.8-1400	1400	28000	

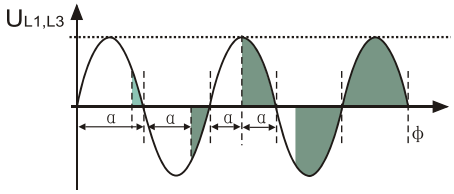
Technical Information

The Basic Principle of Solid Soft Starter

- Utilizing modern microelectronic technology controls the phase position of thyristor conduction angle, realizes to rise gradually the motor terminal voltage tothe system power supply voltage value from an initial setting value. It can optimize the start current and start torque according to driving condition.



Medium Voltage Solid State Soft Starter Basic Principle Diagram

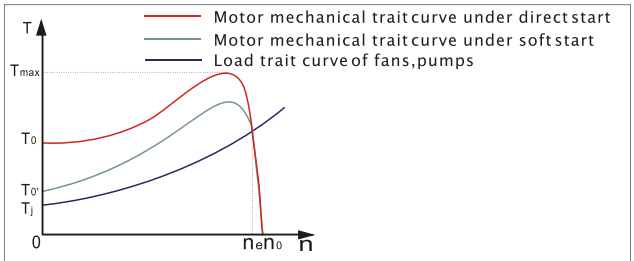


Phase position control for thyristors

- Direct start under full voltage, it will come to a big start torqueTo,which results in a big mechanical force. Soft start can control Toto a proper range(as long as the start torque To' is more than the static resistance torque of the load systemTj),so that the motor can accelerate gradually, remaining the torque of motor more than the load torque until reaching the rated revolution. After that,the system reach balance and the start ends. The process of motors comply with the following equation,

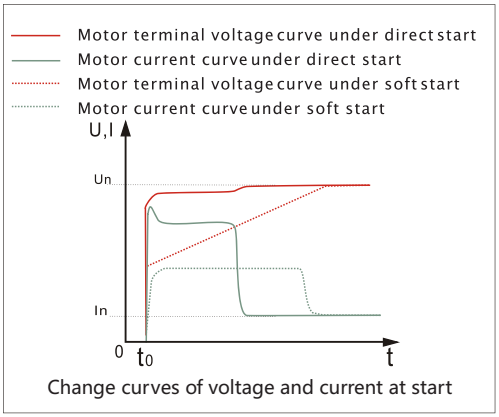
$$T_e \quad T_L \quad \frac{GD^2}{375}\frac{dn}{dt}$$

Te—Motor torque, TL—Load resistance torque, under a given mechanical system,soft start can output different stat voltage curves, also different Te curves, thus go to a controllable start process.



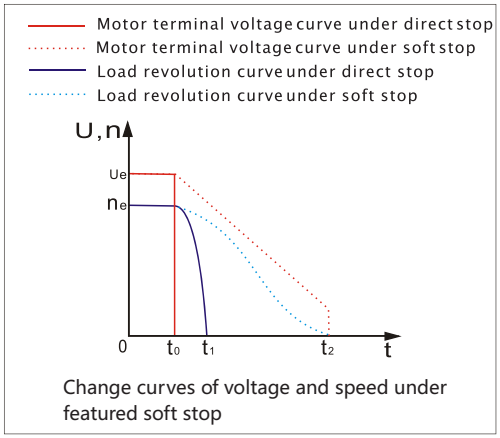
Featured mechanical trait curves

- Direct start under full voltage, the start current can over five times of the rated current.Soft start can reduce to 2~4 times of the rated current.



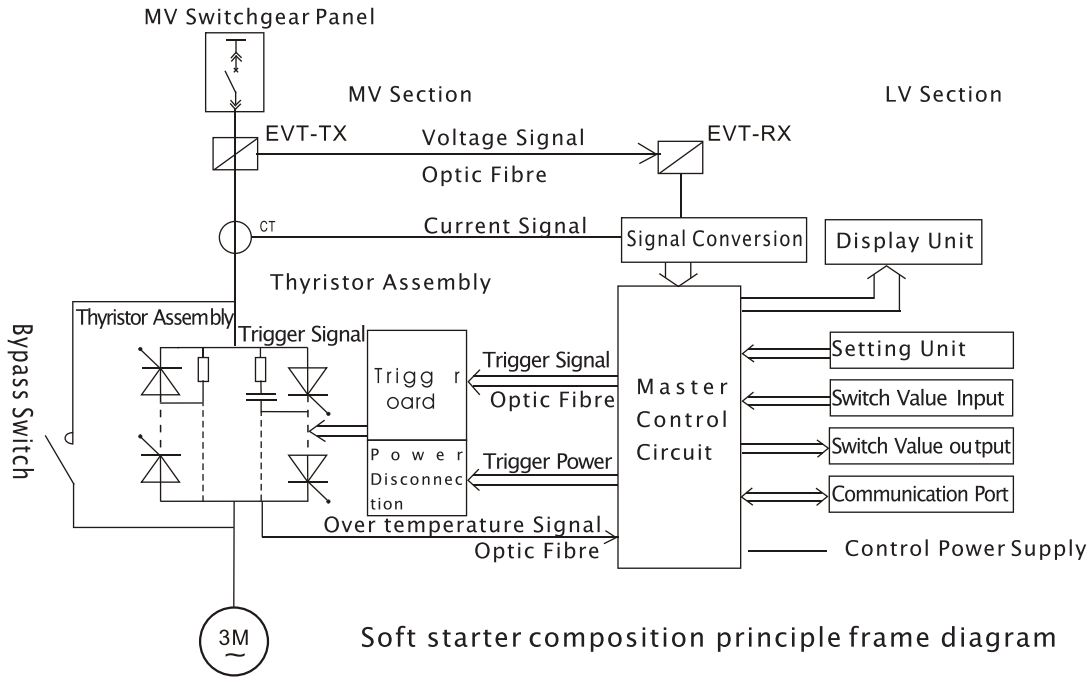
Change curves of voltage and current at start

- Direct start under full voltage, the start current can over five times of the rated current.Soft start can reduce to 2~4 times of the rated current.



Change curves of voltage and speed under featured soft stop

Technical Information

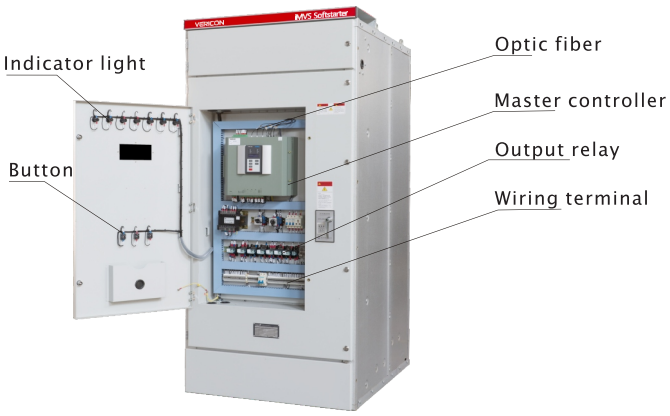


Soft starter composition principle frame diagram

HPMV Soft Starter Composition

- Soft starter is composed of two sections.
  MV Section: MV spare parts are mounted in the MV capsule. Including MV thyristorassembly,EVT-TX(voltage signal sender),CT,triggerboard,bypass switch.
  LV Sextion: LV spare parts are mounted in the LV capsule,including master control circuit,EVT-RX (voltage signal receiver), signal converter, setting unit, input and output unit, power supply.

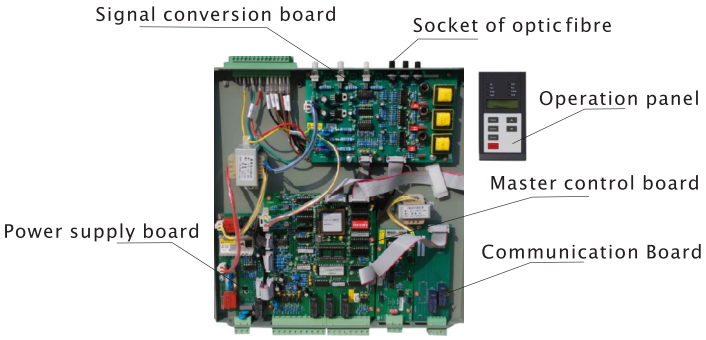
- The MV capsule is located at the back of the panel. After opening the front door and the door of LV capsule, you can see the MV spare parts through a transparent organic glass plate. The back door is fixed by screws. After loosing the screws and opening the back door, the MV spare parts can be seen.



Opened Low voltage capsule

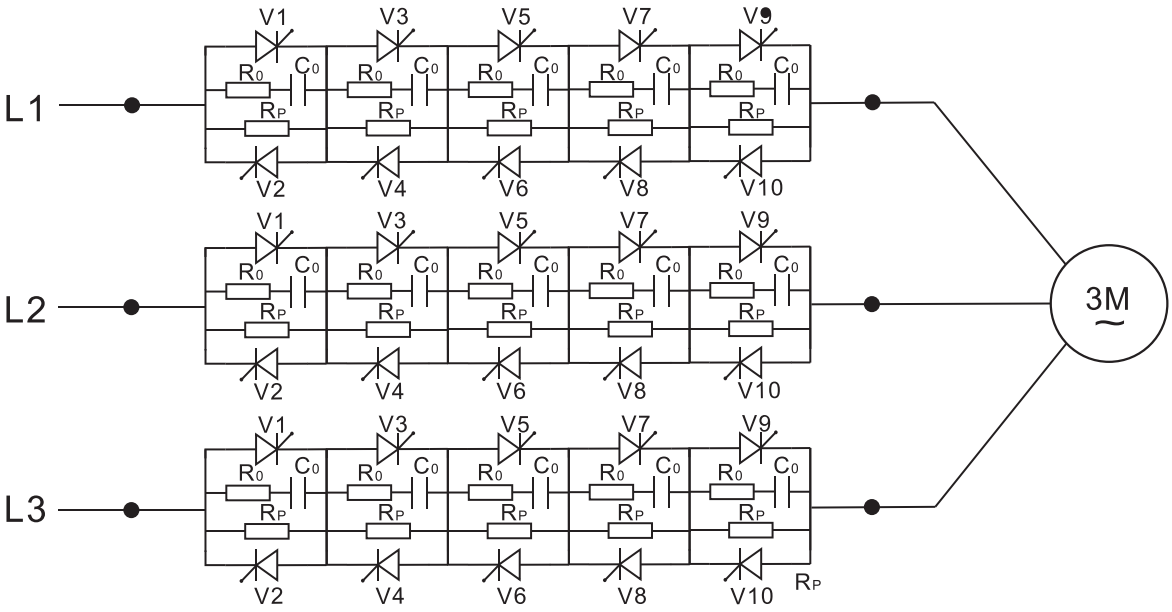
Low Voltage Capsule

- The LV capsule is in the front of the panel.
  The LV capsule can be seen after opening the front door. The LV capsule has been disconnected safely withthe MV capsule through a certain safe way.
  During testing for MV operation,the door of LV capsule can be opened. It is forbidden of opening the door of LV capsule when running!



Master control room

Technical Information



The quantity of thyristor on each cascaded is different depending on voltage grade.

Control panel

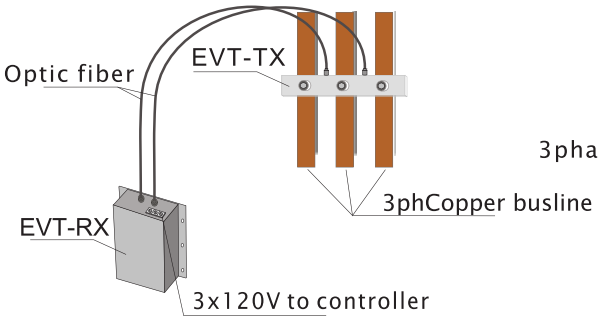
- iMVS control panel provides simple and easy operating, as well as convenient monitor and reading of S/S status. We provides several parameter set for different motor applications. Meanwhile, the parameter could be changed according to customers' particular request.

The major feature:

- LCD-display
- Double line display
- Language: Chinese, English, Russian, German, French, Spanish.
- 8 reading status
- 6 buttom, menu tools, default value for quick using.

Fig 11 iMVS control panel

Technical Information



Schematic diagram of electronic EVT

Low voltage testing

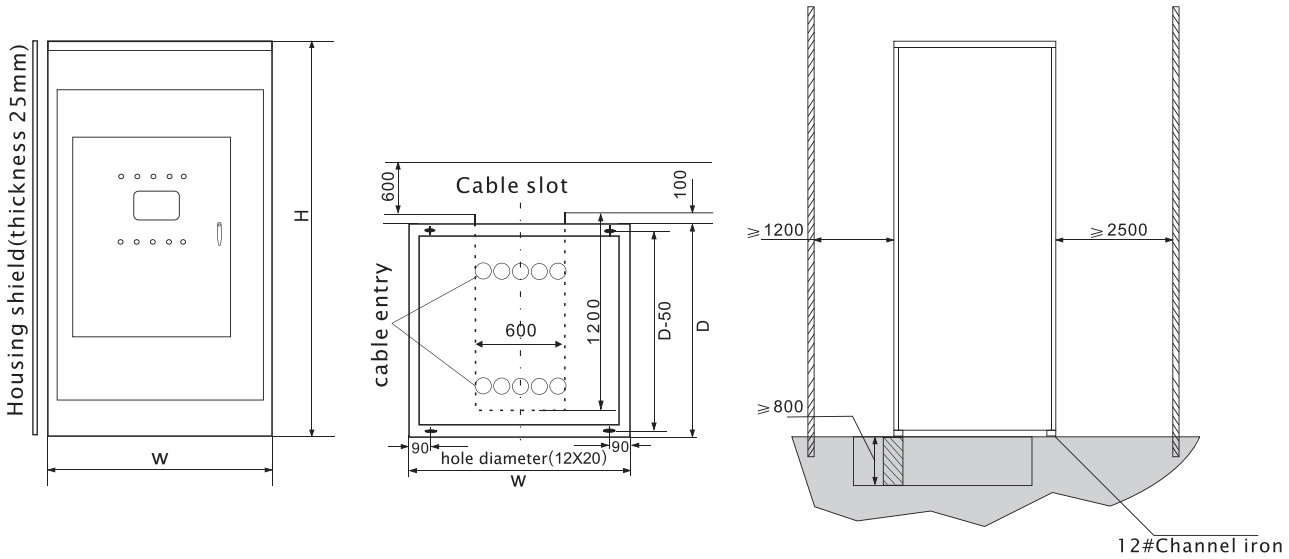
The environmental conditions

The working ambient temperature: -10℃ ~ 50℃

- The storage temperature: -20℃ ~ 70℃
- The working humidity: no higher than 95% at 50℃
- No pollution, explosion or chemical corrosion
- Pollution level: ≤ 3 (optional Lv4)
- Altitude: ≤ 1000m (optional 4000m)
- Vibration: the allowable vibration level is 10Hz~150Hz,
  vibration acceleration: ≤ 0.5m/s^2 Working frequency fluctuation: ± 5Hz, ± 1% within1sec

Products Model & Ordering

Dimension and installation



The explanation of housing and installation

- The default cable installation is bottom entry and bottom exit. Make sure there is sufficient space for cables under cabinet.
- Optionally, the cabinet could enhance a side board for each side. The thickness is 25mm.
- The door of low votlage capsule will open from right side.
- The default colour of major cabinet is MB2071(RAL7032)
- Special request is negotiable.

Ordering information and sample

- According to motor nameplate, we need to collect the information of motor and need to know the motor loading before ordering.
- If the order includes extra information, such as in-line cabinet or drawing, please provide us.

Ordering sample:

- Motor model: TMW2600-10-10
- Rated motor power:2600kW
- Rated motor voltage: 10kV
- Rated motor current: 179A
- Motor loading: compressor
- Starting method: normal
- Soft starter: iMVS-10-200-1
- Quantity:2
- Special request: Side board required.

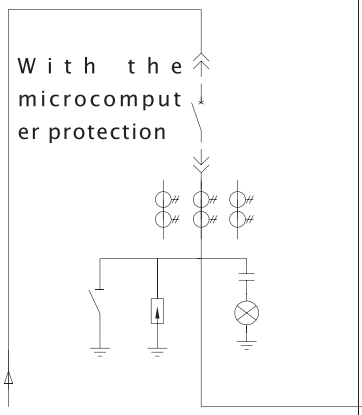
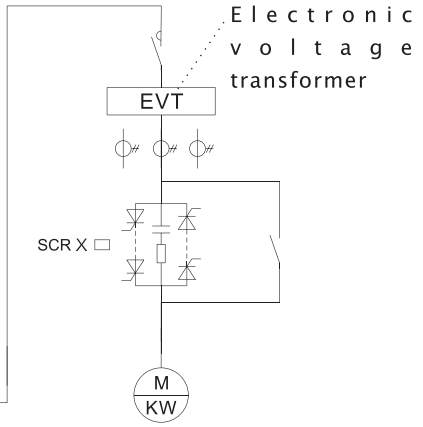
Protection Function

1. phase loss protection When any phase lack, tripping protection	●	●	●
2. Phase sequence protection When the phase sequence connection errors, tripping protection	●	●	●
3. Connection errors protection When the motor starter haven`t been or internal open circuit, tripping protection	●	●	●
4. Over voltage protection Main voltage up to more than 110-125% of the rated voltage, protection function delay 1 to 30 s (adjustable), tripping protection	●	●	●
5. Under voltage protection When the grid is less than 65% rated voltage, the time delay 1-10 s (set), tripping protection	●	●	●
6. Over current protection 5 times the rated current 1-10 s disconnect (configurable), 8.5 times the rated current, 1 cycle disconnect	●	●	●
7. Overload protection Run, 110-150% of the rated current, the cumulative heat load overload, 1-10 s disconnect (set)	●		
8. Over current protection Run.when the main current dropped to less than 20% rated current (set), 1-40 seconds time delay(set),trip protection	●		
9. Unbalanced current protection Main circuit current balances not exceed set numerical adjustable (10-100%), delayed action time (1-60 s adjustable), after starter trip protection	●	●	●
10.The grounding current protection When the grounding current is more than setting value (10-100% is adjustable), time delay of time (1-60 seconds is adjustable), starter trip protection	●	●	●
11.Thermal protection When thyristor radiator temperature over 85 degrees, tripping protection	●	●	●
12.Thyristor short circuit protection Any one (or more) thyristor short circuit, tripping protection	●		●
13.Starter timeout protection In setting the maximum starting time, the motor still not reach full speed, the tripping protection	●		
14. Starting intervalAfter The "starting frequency" instructions, banned starting time (set) in 1-60 minutes, limit the restart	●		
15.The bypass fault protection After the motor starting acceleration cannot switch to bypass, tripping protection	●		
16.The external fault protection Can through the dry contact input external fault signal trip protection	●	●	●

Note : ● Start effectively ● Run effectively ● Soft stop effectively

Typical Drawing

Single line diagram

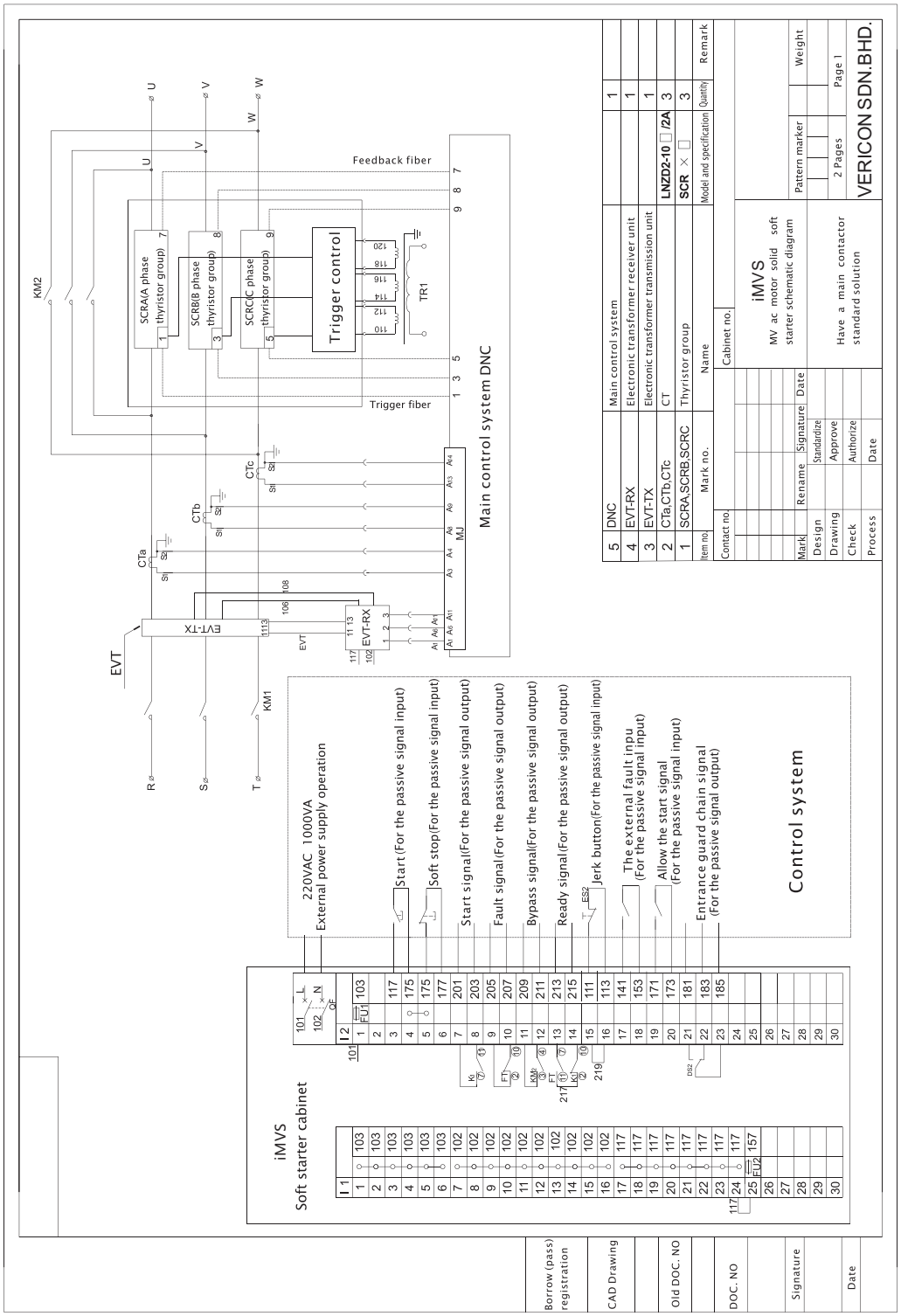
□KV Schemes one: Main contactor to standard schemes one drive one primary scheme Medium & high voltage ac motor solid soft starter			
Model		AH1	AH2
Model		KYN28A-12	iMVS-□-□
Name		High voltage switch cabinet	High voltage solid state soft starter cabinet
Dimension (W*D*H)		800 × 1300(1500) × 2300	1000 × 1300(1500) × 2300
Main component	Vacuum circuit breaker	VS1-12/□-□ AC220V Handcart. Type	
	Thyristor	lightning arrester: HY5WS-17/50	SCR × □ 6500 Thyristor for ABB products
	CT	LZZBJ9-10 0.5/10P15□/□	LNZD2-10□/2
	Electronic voltage transformer	Earth switch: JN15-12	EVT-TX EVT-RX
	Microcomputer protector	NRM-512 AC220V	Main control system: iMVS-DNC
	Vacuum contactor		CKG-□/□ AC220V

Note: high voltage switchgear by the user to choose, customers can bring your own or buy separately

The supply of soft starter is limited to solid state soft starter itself (400A and below will with the build-in bypass switch)
Such as the need to form a complete set of switch cabinet and the bypass switch cabinet must be declared in order

Typical Drawing

Second line diagram (1)



Typical Drawing

Second line diagram (2)